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MEMORANDUM

Date: July 24, 2014

To: Monica Tonel, Site Assessment Manager, EPA, Seattle, WA, Mail Stop ECL-112

From: Linda Ader, START-IV Team Leader, E & E, Seattle, WA

Subject: Preliminary Hazard Ranking System Score
Freeman Ground Water Contamination
Freeman, Washington

Ref: Contract Number: EP-S7-13-07
Technical Direction Document Number: 13-07-0005

A preliminary Hazard Ranking System (HRS) Score of 50 was derived for the Freeman Ground Water Contamination site, which is located in Freeman, Washington as part of a Site Inspection (SI). The site score is based on the SI report generated for the site, and when necessary professional assumptions. The HRS scoresheets, which were generated using Quickscore version 3.0.5 software, are attached.

Site Description:

The site is a carbon tetrachloride ground water plume that was identified in 2001 during routine sampling of the primary Freeman School District water supply well. The plume is located in Freeman, Washington, a rural town in Spokane County located along State Route 27.

The town of Freeman has few residences and is dominated by the Freeman School District school campus. The Freeman Store is present on the north end of town. An active Cenex Harvest States grain handling facility with eleven steel grain silos/bins and one steel grain elevator is present between State Route 27 and a Union Pacific Railroad line which roughly parallels the highway. The Old Freeman Clay Pit, former clay barrow pit, is located approximately 0.5 mile northeast of the former Cenex Harvest States grain handling facility and a former brick kiln is present on the southeastern end of town. Beyond these uses, land near Freeman is primarily used for agricultural production.

Carbon tetrachloride is a manufactured chemical that does not occur naturally. Carbon tetrachloride is a multi-purpose chemical that was used as a degreasing solvent for industrial and domestic purposes, as a fire suppressant, as a cleaning agent for dry cleaning, in making nylon, and for many years was used as a fumigant in grain operations throughout the Midwest. Due to its toxicity, most of these uses were discontinued in the mid-1960s. Until 1986, the largest source of releases to the environment of carbon tetrachloride was from its use as a grain fumigant. Chloroform is a known degradation product of carbon tetrachloride and has recently been detected within the ground water plume.

The SI included field and fixed laboratory analysis of soil samples. The samples collected consisted of subsurface soil samples from the Cenex Harvest States grain handling facility,

upgradient subsurface soil samples from the property containing the Old Freeman Clay Pit, and ground water samples from wells owned by the Freeman School District. Additionally, background samples for all matrixes were collected.

Subsurface soil analytical results revealed the presence of carbon tetrachloride and chloroform at significant concentrations relative to background concentrations at the Cenex Harvest States grain handling facility. The presence of these contaminants also was confirmed in the primary Freeman School District well and in an out-of-use Freeman School District well.

Pathways/Threats Not Evaluated:

The surface water migration pathway, soil exposure pathway, and air migration pathway have not been included in this preliminary HRS score since at present the site consists of a ground water plume.

Site Characteristics Information:

Site Name:	Freeman Ground Water Contamination
CERCLIS ID Number:	WAN001003081
Site Address:	No Street Address Freeman, WA 99015
Latitude:	47° 31' 10.30" (well with highest concentration)
Longitude:	-117° 11' 39.47" (well with highest concentration)
Legal Description:	Township 23 North, Range 44 East, Section 1
County:	Spokane
Congressional District:	5

Sources:

- 1. Contaminated Soil (contaminated soil):** Sampling conducted during the SI revealed a source of subsurface contaminated soil at the Cenex Harvest States grain handling facility. Six borings (SB09 through SB14) were confirmed to contain soil contamination at depths ranging from 17.5 to 32 feet below ground surface (bgs). The concentrations encountered via field and fixed laboratory analysis ranged from 3.21 to 15 µg/kg. Carbon tetrachloride contamination was not present in any sample collected above 14 feet bgs. Fixed laboratory results also indicated the presence of chloroform in two borings (SB09 and SB14); the field laboratory did not analyze samples for chloroform.

The volume of the known extent of carbon tetrachloride/chloroform contamination on site was determined to be approximately 1,345 yds³ using both field and fixed laboratory data. The vertical and lateral extent of contamination associated with the Cenex Harvest States grain handling facility was not determined though it is expected that this contamination likely extends both deeper and more broadly given the placement of borings and corresponding sample results. The hazardous waste quantity of the source is 0.538 (i.e., 1,345 yds³ /2,500 for Tier C).

GROUND WATER MIGRATION PATHWAY:

The Grande Ronde Basalt Formation aquifer is being evaluated.

Ground Water Likelihood of Release:

- An observed release to ground water of carbon tetrachloride and chloroform has been confirmed. An observed release value of 550 is assigned.

A ground water likelihood of release value of 550 is derived.

Ground Water Waste Characteristics:

- The highest toxicity/mobility value that can be assigned is 1,000 based on carbon tetrachloride as the contaminant of concern.
- A hazardous waste quantity value of 100 is assigned.

A ground water waste characteristics value of 18 is derived.

Ground Water Targets:

- The nearest well factor value of 50 is assigned since a drinking water well is subject to Level I concentrations.
- Population:
 - The water well used as the sole source of potable water to the Freeman School Campus (which contains a pre-school, elementary, middle, and high school) has been found to contain carbon tetrachloride above the EPA MCL. Approximately 900 people that use this well for drinking water are subject to Level I concentrations. A treatment system designed to remove contaminants from drinking water has been installed on the drinking water distribution system to prevent further exposure of the campus population. A Level I concentrations factor value of 9,000 is assigned.
 - At present, it is not known whether people are subject to Level II concentrations. A factor value of 0 is assigned.
 - 1,469 people are subject to potential contamination. The distance weighted population by distance ring is as follows:

Distance Ring	Well Population	Distance Weighted Population Value
0 to ¼ mile	10.26	4
¼ to ½ mile	14.52	11
½ to 1 mile	60.50	17
1 to 2 miles	208.28	30
2 to 3 miles	762.70	68
3 to 4 miles	412.72	42
Total distance weighted population		172/10 = 17.2

A ground water population value of 9,017.20 is derived.

- A resource factor value of 5 is assigned because ground water is used for irrigation of five or more acres for commercial food crops within the 4 mile TDL.
- A wellhead protection area value of 0 is assigned because there are no wellhead protection zones located within the 4-mile TDL.

A ground water targets value of 9,072.20 is derived.

A GROUND WATER MIGRATION PATHWAY score of 100 is derived.

If you have any questions regarding this memorandum or its assumptions, please contact me at 206-624-9537.

****** CONFIDENTIAL ******
******PRE-DECISIONAL DOCUMENT ******
****** SUMMARY SCORESHEET ******
****** FOR COMPUTING PROJECTED HRS SCORE ******

****** Do Not Cite or Quote ******

Site Name: Freeman GW Contamination SI Region: Region 10

Scenario Name: Contaminated Soil Source

City, County, State: Freeman/Spokane, Evaluator: L. Ader
Washington

EPA ID#: WAN001003081 Date: 07/09/2014


Lat/Long: 47:31:10.30,-117:11:39.47

Congressional District: 5

This Scoresheet is for: SI

Scenario Name: Contaminated Soil Source

Description: The SI revealed a subsurface soil source of contamination for the ground water plume.

	S pathway	S ² pathway
Ground Water Migration Pathway Score (S _{gw})	100.0	10000.0
Surface Water Migration Pathway Score (S _{sw})	0.0	0.0
Soil Exposure Pathway Score (S _s)	0.0	0.0
Air Migration Score (S _a)	0.0	0.0
$S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10000.0
$(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4$		2500.0
 $(S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2)/4$		50.0

Pathways not assigned a score (explain):

TABLE 3-1 --GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor categories and factors	Maximum Value	Value Assigned
Aquifer Evaluated: Grande Ronde Basalt Formation		
Likelihood of Release to an Aquifer:		
1. Observed Release	550	550.0
2. Potential to Release:		
2a. Containment	10	0.0
2b. Net Precipitation	10	0.0
2c. Depth to Aquifer	5	1.0
2d. Travel Time	35	1.0
2e. Potential to Release [(lines 2a(2b + 2c + 2d)]	500	0.0
3. Likelihood of Release (higher of lines 1 and 2e)	550	550.0
Waste Characteristics:		
4. Toxicity/Mobility	(a)	1000.0
5. Hazardous Waste Quantity	(a)	100.0
6. Waste Characteristics	100	18.0
Targets:		
7. Nearest Well	(b)	50.0
8. Population:		
8a. Level I Concentrations	(b)	9000.0
8b. Level II Concentrations	(b)	0.0
8c. Potential Contamination	(b)	17.2
8d. Population (lines 8a + 8b + 8c)	(b)	9017.2
9. Resources	5	5.0
10. Wellhead Protection Area	20	0.0
11. Targets (lines 7 + 8d + 9 + 10)	(b)	9072.2
Ground Water Migration Score for an Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11)/82,5000] ^c	100	100.0
Ground Water Migration Pathway Score:		
13. Pathway Score (S _{gw}), (highest value from line 12 for all aquifers evaluated) ^c	100	100.0

^a Maximum value applies to waste characteristics category

^b Maximum value not applicable

^c Do not round to nearest integer